

## Things to Know, Understand and Do For Chapters 10 and 11: Liquids and Solids/Properties of Solutions

By the end of Chapter 10 you should be able to:

Understand the difference between intra- and inter-molecular forces.
Describe how London Forces work as attractive intermolecular forces
Describe how Dipole-Dipole Forces work as attractive intermolecular forces
Describe how Hydrogen Bonding Forces work as attractive intermolecular forces AND why this is a misnomer.
Understand the relative strengths of each of these forces AND when there is variation in these strengths.
Predict what type of IMF(s) is/are present for any given compound: molecule or ion.
Explain how hydrogen bonding affects the properties of water.
Explain the processes of evaporation and condensation and use Enthalpy of vaporization in calculations.
Define equilibrium vapor pressure of a liquid and explain the relationship between the vapor pressure and boiling point of a liquid.
Predict the relative strengths of IMF's in a given series of compounds and predict/explain how these relative strengths impact the vapor pressure and boiling point of each compound.
Describe how intermolecular interactions affect cohesive and adhesive forces, surface tension.
Use the Clausius-Clapeyron equation.
Be able to read, interpret and analyze phase diagrams to determine phase of matter at any given T and P, triple point, phase transitions and determine the relative densities of solid and liquid AND explain how this was done and why this is so on the molecular level.
Be able to find solid-liquid, liquid-gas, and solid gas lines, triple point, and critical point AND know the definitions of each.

By the end of Chapter 11 you should be able to:

Define the terms solution, solvent, solute and colligative properties (vapor pressure lowering, boiling point elevation, freezing point depression, and osmotic pressure).
Define, perform calculations involving and use the following concentrations units: density, molarity, molality, mole fraction, mass percent, and parts per million.
Understand the distinctions between saturated, unsaturated, and supersaturated solutions.
Define and illustrate the terms miscible and immiscible.
Describe the solution process of dissolving a solute in a solvent, including energy changes that may occur.
Understand the relationship between lattice energy, enthalpy of hydration to the enthalpy of solution for an ionic solute.
Describe the effect of pressure and temperature on the solubility of a gas as a solute.
Use Henry's Law to calculate the solubility of a gas in a solvent.

Ch 11 KUD con't
Apply Le Chatelier's Principle to the change in solubility of gases with pressure and temperature changes.
Calculate the mole fraction of a solute of solvent( $\chi_{\text{solvent}}$ ) and the effect of a solute on solvent vapor pressure ( $P_{\text{solvent}}$ ) using Raoult's Law.
Calculate the boiling point elevation or freezing point depression caused by a solute in a solvent.
Use colligative properties to determine the molar mass of a solute.
Characterize the effect of ionic solutes on colligative properties.
Use the van't Hoff factor, $i$ , in calculations involving colligative properties.
Calculate the osmotic pressure ( $\Pi$ ) for solutions, and use the equation for osmotic pressure to determine the molar mass of a solute.
Distinguish between an ideal and a non-ideal solution
Recognize the difference among a homogeneous solution, a suspension, and a colloid (or colloidal dispersion).
Recognize the following types of colloids: Aerosol. Foam, Emulsion, Gel, Sol

#### Ch 10/11 HW

#### Student Presentations Ch 10/11

pg 474 Q 2  
 pg 475 Q 3, 10, 15, 19, 28, 29  
 pg 476 Q 31, 33, 36  
 pg 480 Q 87, 90, 91  
 pg 518 Q 1  
 pg 519 Q 3, 8, 14  
 pg 520 Q 21, 26, 33, 37  
 pg 521 Q 41,  
 pg 522 Q 60, 71  
 pg 523 Q 77, 83

pg 476 Q 34, 35  
 pg 477 Q 82  
 pg 481 Q 104  
 pg 519 Q 11, 12 a-c  
 pg 520 Q 25  
 pg 521 Q 43, 45  
 pg 522 Q 58, 59